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# Model 211 Temperature Monitor



| | |
|---|---|
| **Thermometry** | |
| **Number of Inputs** | One. |
| **Measurement Type** | Four-lead differentiall. |
| **Excitation** | Constant current,10 µA or 1mA |
| **Isolation** | Measurement is not isolated from chassis ground |
| **Supported Sensors** | Diodes-Silicon, GaAlAs RTDs-100Ω Platinum, 1000W Platinum, Cernox™, Carbon Glass™, ROX™ |
| **Sensor Type Selection** | Front panel selectable |
| **Standard Curves** | DT-470, DT-670, CTI Curve C, PT-100, PT-1000 |
| **Input Connector** | DB-25 |
| **A/D Resolution** | 24 bit |
| **Input Accuracy** | Sensor dependent (see performance chart) |
| **Measurement Resolution** | Sensor dependent (see performance chart) |
| **Maximum Update Rate** | 7 readings per second |
| **User Curve** | One 200-point CalCurve or user curve in non-volatile memory |
| **Front Panel** | |
| **Display Type** | 5 digit LED |
| **Display Units** | °C, °F, V, and Ω |
| **Display Update Rate** | Twice per second |
| **Temperature Display Resolution** | 0.001° from 0°- 99.999°, 0.01° from 100°- 999.99°, 0.1° above 1000° |
| **Sensor Units Display Resolution** | Sensor dependent to 5 digits |
| **Display Annunciator** | K, °C, °F, V/Ω |
| **Interface** | |
| **Serial Interface** | **RS-232C** |
| **BAUD** | 9600 |
| **Update rate** | 7 readings per second |
| **Connector** | DE-9 |
| **Alarms** | **2-high and low** |
| **Settings** | High setpoint, Low setpoint, Dead band, Latching or Non-latching |
| **Actuators** | Display message, relays |
| **Relays** | **2** |
| **Contacts** | Normally Open (NO), Normally Closed (NC), and Common (C) |
| **Contact Rating** | 30VDC at 1A |
| **Operation** | Operate with high and low alarms |
| **Connector** | DB-25 |
| **Analog Output** | |
| **Settings** | Voltage or current, scale |
| **Update Rate** | 7 readings per second |

| | Voltage | Current |
|---|---|---|
| **Range** | 0-10 V | 4-20 mA |
| **Accuracy** | ±1.25 mV | ±2.5 µA |
| **Resolution** | 0.3 mV | 0.6 µA |
| **Min Load** | 500 W | N/A |
| **Compliance** | | 10 V |

| **Scales:** | Temperature | Sensor Units (Fixed by type) |
|---|---|---|
| | **0-20 K** | Diodes: 1 V=1 V |
| | **0-100 K** | 100 O Platinum: 1 V=100 O |
| | **0-200 K** | 1000 O Platinum: 1 V=1000 O |
| | **0-325 K** | NTC Resistor: 1 V=1000 O |
| | **0-475 K** | |
| | **0-1000 K** | |

| **Connector:** | **DB-25** |
|---|---|
| **General** | |
| **Ambient Temperature Range** | 15 to 35 °C at rated accuracy, 10-40 °C at reduced accuracy |
| **Power Requirements** | Regulated +5 VDC@300 mA, +15 VDC@75 mA, -15 VDC@15 mA, 5 pin DIN |
| **Size** | 96 mm W x 48 mm H x 166 mm D |
| **Mounting** | Panel mount into 91 mm W x 44 mm H cutout |
| **Weight** | 0.65 kg (1.5 lbs) |
| **Approval** | CE Mark (consult factory) |

| 211 Sensor Input Performance Chart | | | | | |
|---|---|---|---|---|---|
| **Sensor Type** | **Silicon Diode** | **GaAlAS Diode** | **100W Platinum RTD 500 W Full Scale** | **Ruthenium Oxide RTD** | **Cernox™ RTD** |
| **Temperature coefficient** | Negative | Negative | Positive | Negative | Negative |
| **Sensor units** | Volts(V) | Volts(V) | Ohms(Ω) | Ohms(Ω) | Ohms(Ω) |
| **Input range** | 0 - 2.5 V | 0 - 7.5 V | 0 - 500 Ω[2] | 0-7500 Ω | 0-7500 Ω |
| **Sensor excitation** (Constant Current) | 10 μA ±0.01% | 10 μA ±0.01% | 1mA ±0.3% | 10 μA ±0.01% | 10 μA ±0.01% |
| **Display resolution** (Sensor Units) | 100 uV | 100 uV | 10 mΩ | 100 mΩ | 100 mΩ |
| **Example LSCI sensor** | DT-670-SD with 104H Calibration | TG-120SD with 1.4H Cal. | PT-103 with 14J Calibration | Rx-102A-AA with 0.3E Calibration | CX-1050-SD with 4L Calibration |
| **Temperature range** | 1.4 - 500 K | 1.4 - 500 K | 30 - 800 K | 0.25 - 40 K | 3.5 - 400 K |
| **Standard Curve** | Curve 670 | Requires Calibration | DIN 43760 | LSCI Curve RX-102A | Requires Calibration |
| **Typical sensor sensitivity** | -30 mV/K at 4.2 K<br>-1.9 mV/K at 77 K<br>-2.4 mV/K at 300 K<br>-2.2 mV/K at 475 K | -180 mV/K at 10 K<br>-1.25 mV/K at 77 K<br>-2.75 mV/K at 300 K<br>10 mV/K at 475 K | 0.19 Ω/K at 30 K<br>0.42 Ω/K at 77 K<br>0.39 Ω/K at 300 K<br>0.35 Ω/K at 675 K<br>0.35 Ω/K at 800 K | -80 Ω/K at 4.2 K<br>-4 Ω/K at 20 K<br>-1.06 Ω/K at 40 K | -770 Ω/K at 4.2 K<br>-1.5 Ω/K at 77K<br>-0.1 Ω/K at 300 K |
| **Mesaurement resolution** (Sensor units) | 20 uV | 20 uV | 2 mΩ | 50 mΩ | 50 mΩ |
| **Temperature equivalence** | 1 mK at 10 K<br>16 mK at 77 K<br>10 mK at 300 K<br>10 mK at 475 K | 1 mK at 10 K<br>16 mK at 77 K<br>10 mK at 300 K<br>10 mK at 475 K | 10.6 mK at 30 K<br>10 mK at 77 K<br>10 mK at 300 K<br>10 mK at 675 K<br>10 mK at 800 K | 1 mK at 4.2 K<br>12.5 mK at 20 K<br>47 mK at 40 K | 1 mK at 4.2 K<br>33.3 mK at 77 K<br>500 mK at 300 K |
| **Electronic accuracy** ( Sensor units ) | ±160 uV ±0.01% RDG | ±160 uV ±0.02% RDG | ±0.004 Ω ±0.02% RDG | ±0.10 Ω±0.04% RDG | ±0.01 Ω±0.04% RDG |
| **Temperature equivalence** | ±11 mK at 4.2 K<br>±138 mK at 77 K<br>±88 mK at 300 K<br>±77 mK at 475 K | ±6 mK at 10 K<br>±300 mK at 77 K<br>±150 mK at 300 K<br>±110 mK at 475 K | ±25 mK at 30 K<br>±18 mK at 77 K<br>±70 mK at 300 K<br>±162 mK at 675 K<br>±187 mK at 800 K | ±8.1 mK at 4.2 K<br>±134 mK at 20 K<br>±491 mK at 40 K | ±1 mK at 4.2 K<br>±88 mK at 77 K<br>±1.144 mK at 300 K |
| **Temperature accuracy including electronic accuracy, CalCurve™ and calibrated sensor** | ±31 mK at 4.2 K<br>±193 mK at 77 K<br>±138 mK at 300 K<br>±177 mK at 475 K | ±21 mK at 10 K<br>±390 mK at 77 K<br>±140 mK at 300 K<br>±210 mK at 475 K | ±45 mK at 30 K<br>±38 mK at 77 K<br>±105 mK at 300 K<br>±262 mK at 675 K<br>±287 mK at 800 K | ±24.1 mK at 4.2 K<br>±238 mK at 20 K<br>±705 mK at 40 K | ±9 mK at 4.2 K<br>±138 mK at 77 K<br>± 1.284 mK at 300 K |
| **Magnetic Field use** | Recommended for T ≥ 60K & B ≤3T | Recommended for T > 4.2 K & B<5 T | Recommended for T > 40 K & B ≤2.5 T | Recommended for T > 2 K & B ≤10 T | Recommended for T > 2 K & B ≤ 19 T |

[1] Specified accuracy includes no effects of thermal EMF voltages. An error of 3 mW results from each 1 μV of thermal EMF voltage. In well-designed systems thermal EMF voltage should be less than 10 μV

[2] 0-500 W and 250 W input range is also available on the Model 211

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